



## Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

QUARTERLY JOURNAL  
OF THE  
STATISTICAL SOCIETY OF LONDON.

---

SEPTEMBER, 1845.

---

*Statistical Data for forming Troops and maintaining them in Health in different Climates and Localities.* By Assistant Surgeon EDWARD BALFOUR, Madras Army.

[Read by JOSEPH HUME, Esq., M.P., before the Statistical Society of London, on the 21st April and 19th May, 1845.]

POLITICAL reasons may render it expedient to garrison a district or a country with soldiers, whose foreign origin, and language and customs, prevent their entertaining feelings in common with the natives of the land whom they may be required to coerce; but, where this is not required, from the higher state of health, and, therefore, of efficiency, which troops raised among the indigenous inhabitants of a country retain, it is of importance to employ them in their own land in preference to strangers; and, fortunately for the tranquillity of our rule, the people of India interest themselves so little in the wars that occur, and hostile feelings so rapidly subside, that the duties of our troops have become rather those of police, to check petty disturbances, and give effect to the orders of the civil authority, than of stern military coercion to overawe the countries in which they are located. The people of India may thus be very generally employed as soldiers in their native land; and it cannot be too prominently noticed, that the utmost care in selecting recruits, or attending to the men's health when enlisted, seems unable to retain foreign troops in equal health with that enjoyed by soldiers who are natives of the countries in which they are serving.

There seem to be circumstances, not well understood, inherent in a military life, which cause among soldiers, even in time of peace, and when serving in their native country, a somewhat higher rate of sickness and mortality than occurs among people of the same age in civil life; and in nearly all the foreign stations occupied by the British troops, the deaths among the soldiers exceed in amount the number that are annually carried off by disease and other causes in their native land. The mortality among foreigners residing in any of the countries of the globe is an important subject of inquiry to the British nation, who are scattered over so great a portion of it, and it is also a point of great importance in any inquiry into the causes of sickness among the soldiers of the empire, who for the most part have to serve abroad.

Colonel Tulloch states, that "so far as statistical inquiries have extended, there is no country, either temperate or tropical, where the mortality among the indigenous civil inhabitants, between the ages of 20 and 40, seems materially to exceed 16 per 1,000 annually; and probably

there is no country where troops composed of the indigenous inhabitants are subject to a higher rate."

*Average Annual Mortality per 1,000 in Civil Life in Britain.*

	Died per 1,000 per Annum, at the Age of 29 to 30.
Mortality at the age of 29—30, by the Carlisle Tables . . . . .	10·
Mortality by Mr. Finlayson's observations, deduced from the duration of life among the Government Annuitants . . . . .	13·
Mortality in 17 of the largest towns* where troops are generally sta- tioned . . . . .	15·7
Mortality among the East India Company's labourers . . . . .	12·5
Mortality among the parties insured in the Equitable Office from 1801 to 1832 inclusive, chiefly the better fed classes, between 20 and 40. . . . .	9·1
Mortality among the Metropolitan Police Force . . . . .	9·0
Average Annual Mortality per 1,000 of Men in Civil Life in Britain . . . . .	11·5

The different circumstances of most of the classes from whom the above averages have been drawn, prevent their being placed in comparison with soldiers. The inhabitants of towns are the individuals whose position most closely approximates with that in which troops are placed; and the mortality among the inhabitants of towns in the prime of life is nearly one-third greater than among the rural population. In comparing, therefore, the mortality of military with that of civil life, it becomes necessary to take for our standard the average of those towns in which the troops are generally quartered, and in the previous Table this is shown to be at the rate of 15·7 per 1,000.

*Mortality among Troops of the Kingdom serving in their Native Country.†*

	Annual Mor- tality per 1,000.
Average in civil life in 17 of the largest British towns,* at 20 to 40 years of age . . . . .	15·7
Household Cavalry, from 1830 to 1836 . . . . .	14·5
Dragoon Guards and Dragoons, from 1830 to 1836 . . . . .	15·3
Troops serving in Ireland, 1797 to 1828, average strength, 36,921 .	15·5
Depôts of West Indian Regiments, from 1830 to 1836 . . . . .	18·5
Average Annual Mortality per 1,000 among British Troops in Britain . . . . .	15·9

The deaths among the Foot Guards amount to 21·6 per 1,000 annually, but as causes, hitherto unexplained, seem to affect this branch of the

\* The towns from which this average is drawn are Chester, Leeds, Bolton, Bury, Preston, Wigan, Bradford, Stockport, Macclesfield, with the averages of York, Hull, Norwich, Plymouth, Portsmouth, and Liverpool, and of Glasgow and London. The information in this Table has been drawn chiefly from Mr. Chadwick's Report on the Sanatory Condition of the Labouring Classes.

† These points of information have been obtained from the Statistical Reports on the Health of Troops in the United Kingdom.

service, increasing the deaths above the usual number, they have been excluded in striking the average mortality among the troops in Britain. The mortality among the residents of towns in civil life, and that among the military, who are generally located in the principal towns, so closely approximate, that 16 per 1,000 may be fairly received as the average of the civil inhabitants, as well as of the soldiers employed in Britain.

We thus obtain a standard by which to contrast the loss of life in Britain with that to which our armies are subject when serving in foreign countries, and we observe with regret, from the following Table, that in almost every colony of the empire, the mortality of our troops greatly exceeds the rate they are subject to in their native land.

*Average Annual Mortality per 1,000 of Mean Strength of Troops, Natives of the British Isles, serving in Foreign Countries during Peace.\**

	Annual Mortality per 1,000.
New South Wales . . . Marshall . . . . .	14·1
Cape of Good Hope . . . Reports, &c. . . 1818 to 1836	15·5
Nova Scotia and New Brunswick, ditto . . . 1817 to 1836	18·
Malta . . . . . ditto . . . 1817 to 1836	18·7
Canada, Upper and Lower . . . ditto . . . 1817 to 1836	20·
Gibraltar . . . . . ditto . . . 1818 to 1836	22·1
Ionian Islands . . . . . ditto . . . 1817 to 1836	28·3
Mauritius . . . . . ditto . . . 1818 to 1836	30·5
Bermudas . . . . . ditto . . . 1817 to 1836	32·3
St. Helena, British Troops from 1816 to 1822, and 1836 to 1837	35·
Tenasserim Provinces . . . Reports, &c. . . 1827 to 1836	50·
Madras Presidency . . . Quetelet . . . 1826 to 1830	52·
Bombay Presidency . . . . . 1826 to 1830	55·
Ceylon Presidency . . . Reports, &c. . . 1821 to 1836	57·2
Bengal Presidency . . . Quetelet . . . 1826 to 1830	63·
Windward and Leeward Command, Reports, &c. . 1817 to 1836	85·
Jamaica . . . . . ditto . . . 1817 to 1836	143·
Bahamas, a small detachment . . ditto . . . 1817 to 1836	200·
Sierra Leone, now withdrawn . . ditto . . . 1819 to 1836	483·

If we extend our inquiries on this subject, we shall find that the annual decrement among the inhabitants of other countries when serving in their native land, is very similar to that occurring among the natives of the British Isles, under the same circumstances; and that with them, too, the mortality increases when they are employed in foreign climates. The average annual mortality in the Prussian army, for example, from 1821 to 1830, was 11·7 per 1,000 of mean strength, and among the French troops, from 1820 to 1822, and 1824 to 1826, it averaged 19·8 per 1,000 of mean strength annually. The Prussian army is composed of younger men than the British, and the deaths among the French troops may possibly include those on foreign service, and thus account for the lower ratio of the former, and the higher ratio of the latter.

In most countries, however, we find the native residents enjoying a higher degree of health than the foreigners who may be dwelling among them.

\* The information in these Tables has been obtained from Inspector-General Marshall's work on Invaliding, and from Colonel Tulloch's Reports on the Health of the British Army.

*Average Annual Mortality per 1,000 of Mean Strength of Soldiers of the British Empire, employed in their Native Countries.*

	Annual Mortality per 1,000.
British regiments, natives of the United Kingdom, and serving there	15·9
Maltese Fencibles, natives of Malta . . . . .	9·
Hottentot corps, aborigines of Southern Africa . . . . .	12·5
Bengal Army, natives chiefly of the Northern provinces . . .	13·
Madras Army, natives chiefly of the Peninsula of India . . .	15·
Ceylon armed Lascareyns, natives chiefly of Ceylon, from 1821 to 1835 . . . . .	25·8
Average Annual Mortality per 1,000 Soldiers of the Empire in their Native Countries . . . . .	15·2

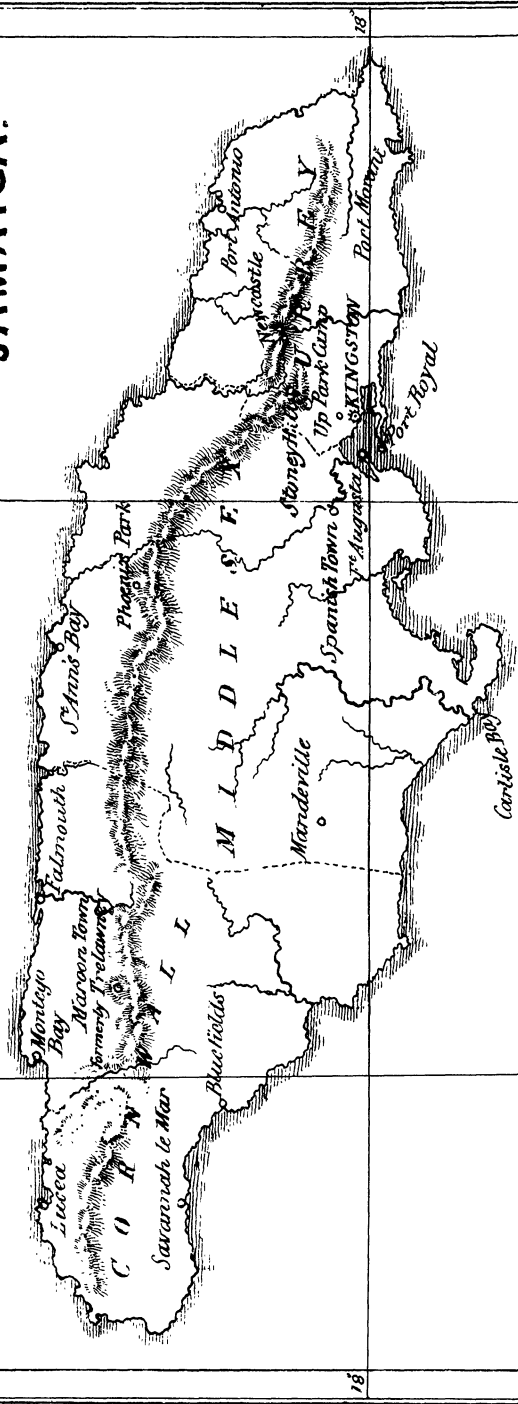
Fifteen per 1,000 of mean strength may thus be regarded as the annual ratio of mortality among the soldiers of the British Empire, when serving in their native countries. The deaths among the Royal African corps amount to 32 per 1,000; but little is known of the native country of the men composing it; being in general recaptured slaves, they may have come from the interior of Africa, possibly from table-lands and regions widely dissimilar to the hot and humid climate of Sierra Leone, where the corps is stationed; and it has been thought proper to exclude them in calculating the average.

But in very few of the foreign countries where the Imperial troops have to serve is their health so good as in their native lands. With them, as with the natives of the British isles, most foreign climates seem to have an injurious effect.

*Average Annual Mortality per 1,000 of Imperial Troops when in Foreign Countries.*

	Annual Mortality per 1,000.
Madras native troops, gun Lascars and Pioneers, serving in the Tenasserim provinces, from 1829 to 1836 . . . . .	12·
Ceylon gun Lascars, natives of Madras and Bengal, serving in Colombo . . . . .	13·
First Ceylon regiment of Malays from Java, Penang, Malacca, and Singapore . . . . .	25·
Negro troops, military labourers in Jamaica, from 1817 to 1836 .	30·
Ditto ditto in Honduras ditto . . . . .	30·
Ditto Black pioneers, of mixed origin, born in the Mauritius, partly, and in part brought from Madagascar, Mozambique, 1825—1836 . . . . .	37·2
Negro troops brought from Africa, serving in Windward and Leeward Command, from 1817 to 1836 . . . . .	40·
Negro troops brought from Africa, serving in Bahamas, 1817 to 1836 .	41·
Ceylon pioneer corps, natives of Madras and Bengal, from 1821 to 1833, serving among the passes and forests of Ceylon, and greatly exposed . . . . .	43·
Negro troops, serving in Ceylon, brought from Goa and Mozambique .	61·
Ditto in Gibraltar, from 1816 to 1820 . . . . .	62·

# JAMAICA.



The previous Tables may be advantageously combined to exhibit—  
*The Average Annual Mortality per 1,000 among the Imperial Forces in their Native and Foreign Countries.*

	Annual Mortality per 1,000.
British troops, natives of the Isles, serving in the United Kingdom	15·9
Ditto, ditto, serving abroad* without the	
Tropics, 21·1 . . . . .	42·2
Ditto, ditto, serving abroad† within the	
Tropics, 63·4 . . . . .	
British troops, natives of the Empire, serving in their native countries	15·2
Ditto, ditto, serving in foreign countries .	35·8

This Table shows that the indigenous inhabitants of tropical as well as of most of the temperate latitudes, however well suited to the climates of the countries where they and their forefathers were born, whenever sent out of their native lands, suffer from a rapid rise in the rate of mortality; and this increased rate is observed when the climate differs but little, as well as when it differs very greatly from the climate of the country in which they were born. A reference to the last Table will show that, among black troops employed in tropical regions, apparently not very dissimilar to their own, the deaths are more than double the number occurring in their native countries, being as 35 to 15. The rate of mortality among British troops, natives of the British isles, is still higher than this when serving from home. In countries without the Tropics, it is half as much more, or as 16 to 21. Within the Tropics, the mortality, in the average of the Commands, is four times higher than in Britain; and, in some of the colonies, the average number of deaths among the British troops, is increased to 20 times the usual amount occurring in their native land.

These rates, too, it must be remembered, only exhibit the mortality during peace, when the troops are placed under the most favourable circumstances. The ratio rises much higher, when to the ordinary hurtful influence of a foreign climate are added the harassing marches, short fare, exposure and anxiety, the invariable attendants of war; and great as the difference is between the number of deaths among our soldiers in Britain, and in the more unhealthy of our colonies, the history of our wars records a still more appalling mortality, and shows how fearfully climatorial agents affect the human frame when fully exposed to their action. The number carried off during war, in temperate as well as in tropical countries, is very great; and there are some facts inducing the belief that the native inhabitants suffer almost as much as the foreigners when equally exposed with the latter. The mental stimulus attending on success, and the depressing effects of defeats and reverses, no doubt exercise an influence over the health. But even with unvarying success,

\* Average of New South Wales, Cape of Good Hope, Nova Scotia and New Brunswick, Malta, Upper and Lower Canada, Gibraltar, Ionian Islands, and Bermuda.

† Average of Mauritius, St. Helena, Tenasserim Provinces, Madras, Bombay, Ceylon, Bengal, Windward and Leeward Command, and Jamaica.

the mortality during war is very high, much higher than in most of our unhealthy colonies. More extended data than any we can here offer would be required to come to any definite conclusions, but the annexed Table will show, to some extent at least, the mortality to be expected during periods of war.

*The Average Annual Mortality per 1,000 of Mean Strength of British Troops during War.\**

	Average Annual Deaths per 1,000.		
	From Wounds.	From Disease.	Total.
For the Expedition to Walcheren, 39,219 troops embarked for service, 28th August, 1809; of these, 217 were killed in action, and 4,175 died from disease, and on the return of the army to Britain, 11,513 were reported sick on the 23d December, a period of 117 days; supposing it to have continued, this would have given an annual ratio of . . . . .	16·7	332·	348·7
In the Peninsula, from January, 1811, to May, 1814, a period of 41 months, out of a mean force of 61,511, the total deaths were from disease, 24,930; from wounds in battle, 8,889; total 33,819 . . . . .	42·4	118·6	160·9
And among the officers during the same period, there occurred . . . . .	66·	37·	103·
In Ceylon, during 1818 and 1819, two years of war, but numbers actually employed unknown. 1st year . . . . .	..	..	218·
In Ceylon, during 1818 and 1819, out of 2,698, the average strength at Ceylon. 2nd year . . . . .	..	..	129·
In Burmah, during 1824, first year of war, deaths among all ranks . . . . .	35·	450·	485·
In Burmah, during 1824 and 1825, first and second years of war, deaths among officers . . . . .	106·6	300·	406·6
In Ceylon, negro troops in 1818 and 1819 . . . . .	..	..	132·3
In Burmah, 10 regiments, Bengal and Madras Sepoys and Pioneers, each supposed 800 strong employed there . . . . .	..	..	400·

War, however, is but a temporary state, and the loss of life, though proportionally severe, is but little in the aggregate compared with the annual loss in foreign countries during peace. It is, therefore, to the means of preserving the soldiers' health in peace that attention should be directed; and when we consider the little success that has attended our efforts to ascertain the causes of the great sickness and mortality which the soldiers of the empire suffer when employed out of their native countries, it cannot but be a source of much pleasure to see it established, that by employing the natives of the countries which we have conquered and wish to retain, to garrison and protect their own territory, we have it in our power to diminish greatly the waste of life: for it seems clearly proved by the foregoing Tables of the ratios of mortality among soldiers, that throughout our colonies in tropical or temperate latitudes, the mortality among the troops of the British Empire, when employed in the countries of which they are the aboriginal inhabit-

\* The information in these Tables is collected from the invaluable Reports of Inspector-General Marshall and Colonel Tulloch.



ants, or in which they or their forefathers have been born and become naturalised, is only 15 per 1,000, or one in every 66 of their number ; while the deaths among our troops when in foreign countries, is often 10 and even 20 times greater.

These facts sufficiently indicate the importance of employing in our armies the natives of the lands that come into our possession, when not debarred from this by political considerations. Indeed, the Indian government have long practically acted on this ; and it is only alluded to here, that one of the principal objects of the plan, that of saving the lives of their troops, may not be lost sight of. The natives in the armies of Bombay, Madras, and Bengal, have been found almost as incapable as Europeans of bearing up against the noxious influences of several of the unhealthy parts of the country.\* The Sepoys of the Bengal army, men recruited in the northern provinces of Hindostan, often suffer so severely in the hot and humid atmosphere of Bengal and Arracan, as to be completely broken up before their period of three years' service expires, and require a change to some of the northern provinces to recruit their health. And the Bombay regiments, which are almost similarly formed, with the addition of a few men from the table-land of the Dekhan, and the valleys of Maharashtra, suffer in the same manner when serving in the plains of Guzerat. I am aware how erroneous deductions from a limited number of cases are apt to be, and therefore refrain from instancing the few that have come to my knowledge, though the fact is generally known that a tour of duty in Bengal, Arracan or Guzerat, often cripples the regiments before it expires. Corps have accordingly been raised in many parts of India for sanatory as well as political reasons, to occupy particular districts and localities. A local corps composed of Mugs, the natives of Arracan, has been raised under the name of the Arracan Battalion, to perform the military duties there. In the Bengal Presidency, in addition to the regiments of irregular cavalry and infantry, there are several corps peculiarly local, raised and employed in unhealthy districts, and among the forests, hills, and passes, where the troops of the regular army are found inefficient ; and the Nasseree battalion, the Bhagulpore hill rangers, the Silhet light infantry, the Joudhpore legion, and the military police in central India, might be mentioned as instances of the carrying out of this system.

I am aware that political reasons led to the formation of many of these corps ; but the superior health of the aborigines to that of the men in the regular armies, who may be regarded as foreigners, was also kept in view when they were being raised.† The Talain corps in Burmah,

\* "The native soldiers on the Bengal establishment," says Captain Henderson (As. Res., Vol. xx. Part 1), "are particularly healthy under ordinary circumstances. It has been found by a late inquiry, embracing a period of five years, that only 1 in 135. = 7·6 per 1,000 of the men on the actual strength of the army, died per annum. So injurious, however, is Bengal proper to this class of natives, in comparison with the Upper Provinces, that although only one-fourth of the troops are stationed in Bengal, the deaths of that fourth are more than a moiety of the whole mortality reported."

† Though the Indian armies are employed in Asia, and therefore in countries not altogether dissimilar in climate and products to that of their native provinces, there are, nevertheless, marked differences in climate existing in consequence both of latitudes and altitudes. And not more than half the Madras army, and about the same number of the Bengal troops, are at any time serving in the territories of which they are, strictly speaking, natives ; while nearly the whole of the Bombay army are strangers in the countries in which they are employed.

and the Nair brigade on the Malabar coast, are perhaps the only instances in the Madras Presidency of the adoption of this principle. The Ahmednugger police corps, raised among the Mhars, Ramossies and Bheels of the neighbourhood, to occupy the posts along the hill ranges of the Dekhan; the Bheel corps, formed to coerce their own tribes among the hills and valleys of Guzerat and Candeish; the Tannah and Concan, or Rutnagheree rangers, holding posts between the Concan and the Dekhan, are instances of the employment of the aborigines as troops by the Bombay government, who retain other local corps in several parts of the country. In Bengal there are more than 30 irregular corps of foot and horse, many of them employed for purely local purposes; and in Bombay they are as much required as in Bengal, because the humid atmosphere among the forests and western ghats, and the hot, moist climate of Guzerat, is found as inimical to the health of the Rajahpoots and natives of the Dekhan, of whom the regiments of the Bombay Presidency are composed, as the almost similar climates of the provinces of Bengal and Arracan are to their Bengal comrades.

The frequent occurrence and the severity of the diseases of tropical countries had long made us aware of the differences existing in the salubrity of neighbouring localities. "It is now ascertained that even in our own country there is a very material difference in the degree of health and longevity attained by the rural inhabitants of some counties compared with others; for instance, those resident in North and South Wales, Cornwall and Devon, Northumberland and Cumberland, have not so high a mortality, by at least a tenth part, as those in the central counties of the kingdom. The same remark also applies to the Highlands of Scotland; and it appears that the troops in the latter country have been rather more healthy than in England or Ireland."\* But in most of our colonies, where the agent that excites disease acts with greater intensity, these differences are more strongly marked, every island, and almost every province, within the tropics, furnishing us with instances of disease and death occurring with great frequency in one place, while in another, only a few miles distant, the mortality may scarcely exceed what the troops would be subject to in their native land; and our knowledge of this fact, though acquired only by experience, and at a great loss of men and money, points out to us one means of preserving the lives of our men. It is true that political reasons may often render it necessary to retain our soldiers in very unhealthy districts, and we shall then be called upon to employ all our skill to protect their health. But where these state necessities are not very urgent, it will often be possible to locate men where they will be free from sickness, within a few hours' march of the unhealthy district over which they are required to watch. During times of trouble and disorder, much, as regards health, must remain subordinate to the safety of the force and the security of the district or country in which it is placed; but the profound quiet throughout our Eastern dominions is a sufficient proof that there are, at least, no such urgent demands upon our European troops there as should compel us to sacrifice their health; for this part of the army, though ready at all times to take the field at an hour's warning, have for more than a quarter of a century been employed only in distant expeditions against a foreign enemy, marching for months before they reached the

\* Reports on the Sickness, Mortality, and Invaliding of the British Army.

scene of war. With such long marches before them, it must be immaterial from what position in a remote province the troops first break ground; a few miles to the right, or left, or rear, would not retard for a day their junction with the brigade with which they were destined to co-operate.\* It is true that the chief authorities of the Government can alone possess that knowledge of the state of the people requisite to decide on the districts requiring the presence of troops, and with them the distribution of an army must ultimately rest; but it must be at all times useful to know the localities where a force may be placed with the certainty of their suffering the least possible loss from sickness and death. This subject has often before been noticed; but from various causes, perhaps from the limited number of facts that could be brought to bear on it, it has not hitherto attracted the attention it deserves. The reports published on the health of troops in the British colonies, enable us, however, to give numerous instances of great differences in the degree of health enjoyed in stations only a few miles apart; and, considering its importance, whether as a means of reducing the heavy sick lists, of lessening the number who die every year, of effecting a great saving to Government, and placing in their hands a greater amount of disposable force, it may not be deemed needless to enter somewhat at length into the details of those colonies where the differences in the degree of health are most marked.

The forces serving in the Windward and Leeward command, from 1817 to 1836, averaged 4,333 strong. During that period, 7,069 men died, and the average annual mortality was 85 per 1,000 of mean strength. But the following table of the rates of mortality in the different islands will show that it is possible to distribute the troops in such a manner as to diminish this number of deaths:—

—	Annual Ratio per 1,000 of mean Strength died.	Average Strength.
Antigua and Montserrat . . . . .	40·6	403
St. Vincent's . . . . .	54·9	372
Barbadoes . . . . .	58·5	1,197
Grenada . . . . .	61·8	313
St. Kitts, Nevis, and Tortola . . . . .	71·0	290
British Guiana . . . . .	84·0	884
Trinidad . . . . .	106·3	310
St. Lucia . . . . .	122·8	241
Dominica . . . . .	137·4	236
Tobago . . . . .	152·8	170

The island of Dominica lies detached from the others, being more than 100 miles north of St. Lucia, and it might be imprudent to weaken the force there; but the same objection does not apply to some of the others that are nearer each other.

\* European troops could never be employed as the police of a district, the duties of which must be performed by the less expensive part of the Indian army—the native soldiers. The latter, indeed, are, to a great extent, employed in duties which might be as well done by undisciplined men; and though such employment tends greatly to injure discipline, it is, nevertheless, almost indispensable, in order to diminish the heavy expense of so large an army.

* ———	Ratio of Deaths per 1,000 annually.	Average Strength.
Antigua and Montserrat, 1817 to 1836 . .	40·6	403
St. Kitts and Nevis, only 50 miles North- West of Antigua . . . . . }	71·0	293
St. Vincent's . . . . . }	54·9	372
St. Lucia, 40 miles North of St. Vincent .	122·8	241
Grenada . . . . . }	61·8	313
Trinidad . . . . . }	106·3	310
Tobago, 6 miles East of Trinidad, and 60 miles South-East of Grenada . . . }	152·8	170

If the degree of health enjoyed by the troops regulated their distribution, the vicinity of Antigua to St. Kitts, with double the ratio of deaths, and of St. Vincent's to St. Lucia, and of Grenada to Tobago, with more than twice the rate of mortality, might be easily taken advantage of to station the head quarters in the islands where the troops enjoy the highest degree of health, retaining only small detachments in the sickly islands. It is doubtless a serious matter at any time to weaken a force too much, and the risk from doing so is greater where there may be a difficulty of re-inforcing the troops on emergency. In such an island as the Mauritius, for instance, which is nearly two months' sail from any colony whence additional troops could be brought, to reduce the force might endanger its safety. But the Leeward Islands are all so contiguous that most of the unhealthy islands could receive support within a few hours after a re-inforcement was required; and, indeed, with the aid of steam and other means of communicating intelligence rapidly, even the islands that are farthest apart might, on an emergency, obtain assistance in a day; and this reasoning is still more applicable to the distribution of troops in a small island, or in the province of a continent where no obstacle exists to interrupt communication or obstruct the advance of troops.

Within the last few years the Bombay Government have applied their knowledge of the differences that exist in the salubrity of adjoining districts to save the lives of their European troops. "On the island of Bombay and Colabah, (a narrow slip jutting out from Bombay into the sea,) the health of the Europeans was so unsatisfactory, and the mortality so high, that they determined to remove them from Bombay, and leave only a small detachment, sufficient to supply a few guards. And the head quarters of four of the European regiments belonging to the Bombay Presidency are now located at Poonah and Kirkee, where the average rate of mortality for the last 10 years has been 23·3 per 1,000; a ratio very small for India, and not much exceeding that of the Foot Guards in England."<sup>†</sup>

\* It is not meant to be asserted that the distribution in this Table is the best that could be adopted, or even practicable. The distribution, as was previously mentioned, must be left to the Government. The sole object is to make it manifest that great differences as to health do exist in adjoining localities; and I think we are called upon, as well from motives of humanity as for the purpose of saving expense, to occupy those which we know to be healthy, and search for others that may be equally so.

† Letter from Superintending Surgeon Glen, Bombay Army, to the Secretary to the Madras Government, dated 1st May, 1840.

It is to the course adopted by the Bombay Government that we would particularly direct attention. If the European forces at Poona were required in the neighbourhood, (though it must be again noticed that their duties are not those of police, neither to pursue plunderers nor to quell civil commotions,) the excellent roads and bridges, and other facilities for moving, bring the principal points in the districts within a few days' march; and even Bombay, the seat of government, is only 80 miles distant, a journey which infantry might easily accomplish in 60 hours.

As our knowledge of the colonies of the empire increases, we may confidently hope that many healthy localities will be discovered and occupied, as Poonah has been. But as this subject has been hitherto little attended to, some remarks may be made on a few of the sites which experience has proved to be well adapted for the residence of Europeans, as they serve to show how much we have it in our power to preserve the lives of men, and also to point out where healthy localities are likely to be met with. The principal portion of the European or native forces should be located in these healthy districts, and (if it ever be admissible in tactics to detach small bodies of men,) detachments or guards could be furnished to the unhealthy parts of the country, which political reasons, or the necessities of the state, prevented being altogether abandoned.

The island of Jamaica affords an instance to illustrate this. From 1817 to 1836, a force of 2,578 on the average was distributed over it. Many of the stations have proved excessively unhealthy; but "while in some parts of the island half the troops, or at the rate of 500 per 1,000 of the strength, were swept away every year, in others the average mortality has not exceeded 32 per 1,000."

	Ratio per 1,000 of Mean Strength died.	Average Strength.
Phoenix Park . . . from 1833 to 1836	29•	61
Montpellier . . . „ „	30•	67
Maroon Town . . . from 1817 to 1836	32•5	190
Mandeville . . . from 1833 to 1835	35•	75
Fort Augusta . . . from 1817 to 1836	78•3	389
Lucia . . . „ „	91•	83
Stony Hill, nine miles north of Kingston . } „ „	96•8	362
Falmouth . . . „ „	110•6	194
Port Royal . . . „ „	122•3	254
Up Park Camp, two miles north of King- ston . . . „ „	152•8	726
Port Antonio . . . „ „	162•5	137
Spanish Town . . . „ „	177•1	336

And though such differences exist, the island is only 160 miles in extreme length and 50 in breadth, and could be traversed by troops from end to end in a few days. It is evidently, therefore, in our power to withdraw the soldiers from the stations where they have suffered so

much, and to place them in those localities which experience has proved to be favourable to the European constitution.\*

Let us now turn to Ceylon, in which an average force of 2,149 men has been stationed since 1817. The principal stations are Colombo, Kandy, Trincomalee, Galle, and Niuera Elia which has been occupied since 1829. (Badulla and Ratnapoora, at one time stations, were abandoned in 1832.) The table given of the rates of mortality will show that at some of the stations the ratio of deaths is quadruple what it is at others : —

STATIONS IN CEYLON.	Ratio per 1,000 of Mean Strength died.	Average Strength.
Galle, from 1817 to 1836 . . . . .	23·	182
Niuera Elia, from 1831 to 1836 . . . . .	24·	116·6
Ratnapoora from 1817 to 1832 (now abandoned)	42·7	54
Colombo, from 1817 to 1836 . . . . .	51·9	920
Kandy „ „ . . . . .	60·7	433
Trincomalee „ „ . . . . .	91·4	284
Badulla, from 1817 to 1832 (now abandoned) .	97·1	75

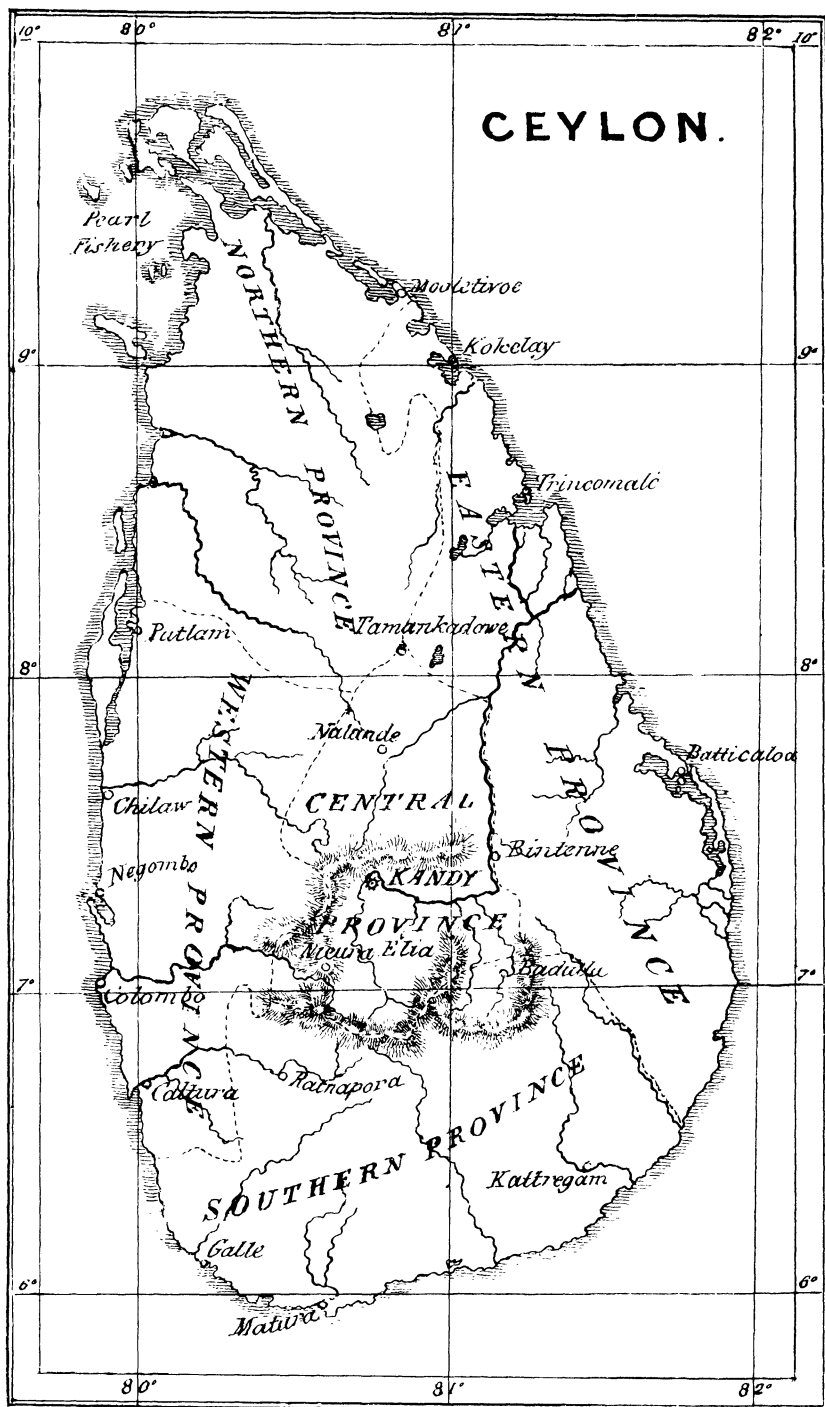
Considering the small size of the island of Ceylon, it cannot be necessary to submit to the loss of men which the unhealthy climate of some of the posts occasions. Indeed, the possibility of effecting a saving of life is often the only point requisite to be known, and this fact is sufficiently established by the preceding table. From the superior degree of health enjoyed by the few troops stationed at Niuera Elia, we may form an opinion of the benefit that would result from making this central position the principal station in the island, and the passes leading into the low country, and the plains and alluvial lands below, could be guarded by the black or native troops, whose constitutions are fitted for the climate. Indeed this practice has been partially adopted already; “a detachment of the Ceylon Regiment or of the Pioneer Corps having generally been quartered about 12 miles from this station, for the purpose of keeping open an extensive pass, connecting this part of the country with the Kandy district.”† Galle, alone, of all the other stations, can compete with Niuera Elia as to salubrity; but its situation in the extreme south renders it less eligible as a military position to command the whole island.

It is almost unnecessary to follow this subject further; but it may be desirable to give a short description of some of the mountain ranges in India, which have already been occupied as convalescent stations, as they afford many advantages for locating European troops conveniently with reference to important districts, so as to enable us to withdraw them from the neighbouring posts in the plains where they are now distributed, and are suffering much from sickness.‡

\* Since these remarks were written, I am informed that (in 1844) this change has been introduced. One regiment of Europeans has been stationed at New-castle, and another at Maroon Town; and a third West India regiment, 1,000 strong, has been raised to occupy the low country.

† Report, &c., 1841.

‡ App. C.



“The Neilgherries are an insulated range of mountains, extending between the Eastern and Western Ghauts, from west to east 34 miles, and from north to south 15 miles, and rise almost in the centre of the peninsula of India, to the height of 7,000 or 8,000 feet above the level of the sea.\* They also elevate to the height of 2,500 feet above the ocean a vast plateau of table-land, containing some of the most fruitful districts in the Madras Presidency.† The climate of the Neilgherry Hills, which thus mark so strongly the features of the country, is more temperate than that of Great Britain; its whole range being also within the limits assigned by authorities as the most favourable to the European constitution.”

	Great Britain.	Neilgherries.
Mean temperature . . . . .	56·3	56·7
Extreme ranges of temperature . .	90° & 11°	73° & 31°
Number of days without rain . . .	220	265
„ „ cloudy . . . . .	60	28
„ „ fair . . . . .	160	237
Quantity of rain annually . . . .	..	47·78 inches.

The medical officers who have been stationed there, and all Europeans who have visited the hills, assure us that the change from the low countries produces a general restoration of mental and physical power, shown by a great and gradually increasing exhilaration of spirits, and in a most remarkable degree by increased capability of bearing fatigue, and of relishing and digesting food; and it is asserted by all the officers and families who have resided in the hills, that these beneficial effects have continued for a long period of time afterwards, extending in some instances to years.

Troops have never been stationed on the hills; but out of a small number of healthy Europeans residing there, only two casualties have occurred—one from sickness contracted in the country, and one from disease of long standing. The mortality among the large number of European children residing there does not exceed 40 per thousand, while in England, at the same ages, the mean mortality of both sexes is 50 per 1,000; in Belgium it is 65 per 1,000, and in Sweden it is 85 per 1,000.

The mortality among sick Europeans gives more striking results. Of 147 sick officers, treated between February, 1831 and 1834, only four

\* Jackanairi is 5,659 feet, Jacktally 5,976 feet, Dimhutty 6,041 feet, Ootacamund 7,400 feet, and Dodapet 8,800 feet above the ocean level.

† These districts are—Bellary, embracing an area of 12,980 square miles; Cuddapah, of 12,970 square miles; and Coimbatore, 8,280 square miles; these three districts possessing a population of two millions and a half of souls. Another, the Mysore territory, now held by British troops, situated between 11° and 15° north latitude, in length 210 miles, with an average breadth of 140 miles, forms part of the table-land, and attains an elevation of 2,000 to 2,500 feet, enclosed on two sides by the Eastern and Western Ghauts. At Bangalore, a plateau of 50 miles by 50, the surface is undulating, and nearly 3,000 feet above the sea. To the north, after passing Nandydroog, the country falls rapidly, and towards Seringapatam the surface has a sudden descent. Seva Ganga, the highest mountain in Mysore, is 4,600 feet above the sea. In so elevated a region there are no large rivers, but the small streams which descend from the plateau are numerous, and fertilize a great portion of the country.



died, being at the rate of 27 per 1,000, while in Great Britain the mortality is 15·7 per 1,000 of strength; and in the Foot Guards 24 per 1,000 every year. The mortality in the convalescent dépôt that was formed on the hills, for the same period, (excluding three deaths which occurred immediately on arrival,) was 6 in 108, or 57 per 1,000, the same as that of the British troops in India, sick and well. We have thus entered into details, (remarks surgeon Baikie,) because we have no proper data on which to found our observations, though it is obvious that neither of these rates of mortality are fairly available for comparison. From data furnished by Inspector-general Brooks, (returns from 1826 to 1832,) we can estimate the probable mortality to which Europeans would be subject if stationed there. The deaths out of 60,954 living in India amounted to 3,486, or 57 per 1,000, in the following proportions:—

Fever . . . . .	15·4	Pectoral Complaints . .	2·5
Liver . . . . .	4·2	Bowel „ „ . .	18·4
Cholera . . . . .	11·5	Miscellaneous „ „ . .	5·0

But from the fact that all endemic and epidemic diseases, and the four great scourges of the Europeans in the low country, fever, dysentery, cholera and disease of the liver, as a consequence of climate, are unknown, *we may safely predict that the number of deaths, among a body of troops stationed on these hills, would not be much above the average mortality among the troops in Great Britain*;\* and to learn the saving of life that might be effected by forming cantonments there, it is only necessary to examine the returns from neighbouring stations for 1842.

—	Ratio of Deaths per 1,000 of Mean Strength.	Strength, 1842.	
Neilgherries; no exact data, but supposed mortality . . . . .	20·	..	
Cananore . . . . .	52·2	613	
Bangalore . . . . .	29·	2,167	
Trichinopoly . . . . .	40·4	420	
Arnee and Arcot . . . . .	56·7	1,551	
Bellary . . . . .	94·3	530	

“The importance of the Neilgherry hills, as a central position, may be learned from the fact, that about 4,000 European and 10,000 native troops are distributed at Mangalore, Cananore, Palamcottah, Mercara, Trichinopoly, and Bangalore, the principal stations at their base. The distance from the Neilgherry hills to Calicut is 56 miles; to Cananore, 130; to Trichinopoly, 153; Bangalore, 176; and Madras, 393.

“The nature of the approaches to the hills affords the greatest facility of access. The Conoor, Goodooloor, and Segoor passes, one on the north, the others on the south and west, are open at all seasons and at all periods of the monsoon, and are practicable for wheel-carriages; and if the Koondah Ghaut were completed, a regiment could, in three or four marches, reach Arricole on the Bey pore River, whence it is navigable at all seasons to its embouchure at Calicut, the distance being a little more than 30 miles.”

\* Letter from Surgeon Baikie, M.D., dated 1st May, 1840, to the Secretary to the Madras Government.

In the Bombay Presidency, a convalescent station has been formed at Malcolmpett, on the Mahabaleshwur hills, which form a part of the western chain that stretches from Surat to Cape Comorin, though the hills are in a great measure insulated from the surrounding country. The site selected for the position of the sanatorium is in  $17^{\circ} 56' N.$ , and  $73^{\circ} 30' E.$ , 24 miles due east, and at an elevation of 4,500 feet from the ocean, on the seaward or westward slope of the mountain. It is thus freely exposed to the influence of the sea-breeze, while it is protected against the force of the easterly winds.

On the western side the hills rise precipitously from the Concan, over which they tower to the height of 4,000 feet; and to the eastward they are elevated 2,000 feet above the table-land of the Dekhan. The surface of these hills has an area of 50 or 60 miles, undulating, and in some parts hilly, which prevents the rains collecting on the tenacious clayey soil, formed by the decomposition of the laterite, or iron ore rock, of which they are composed. Their elevation is not sufficient to raise them above the influence of the monsoon, and the heavy rains that pour on the hills cause all the sick to abandon them.\* They are again crowded during the hot season by invalids, and others from the neighbouring stations, who seek refuge from the burning heats of the plains, to gather fresh vigour from the temperate climate, and interest the mind with the scenery of the hills. There are several important stations for European troops at short distances from those hills.

On the lower ranges of the Himalayas, on the north and north-west frontier of the Bengal Presidency, stations for convalescents and regiments have been formed, taking advantage of their elevation above the sea, to secure the health of the troops required in that important quarter of our territories. Subhathoo, in north latitude  $30^{\circ} 58' 12''$ , and east longitude  $76^{\circ} 58' 37''$ , is now a British cantonment, romantically situated in the district of Bareilly, 4,456 feet above the ocean. One European regiment occupies the station.

Almora is built on a ridge of mountains, 5,400 feet above the level of the sea, in latitude  $29^{\circ} 35'$  north, and longitude  $79^{\circ} 40'$  east. The Almora district is separated from Bareilly by the Kumaon hills, and, properly speaking, is only a subdivision of the Kumaon district. Two corps of artillery and two regiments of native infantry are stationed at Almora. At Simla (7,000 feet), there is only an irregular corps stationed. The Government have there founded a delightful station for

\* Bombay annual fall of rain:—At Khandalla, 1,740 feet above the sea, and 30 miles inland, 168.75 inches of rain fell; while at Poonah, 40 miles further eastward, only 23.43 inches fell. The average fall at the sanatorium, on the Mahabaleshwur, 25 miles due east from the sea, and 4,500 feet above its level, is 239.80 inches annually.

AMOUNT of RAIN during June, July, August, and September, 1842.

—	Sanatorium Mahabaleshwur.	Pamghurry.	Poonah.	Bombay.
Monsoon, 1842.	Inches. 289.37	Inches. 48.67	Inches. $14.77\frac{1}{2}$	Inches. 87.33

The heavy rains will prevent the Mahabaleshwur being made the site of cantonments, but as a sanatorium it is invaluable.

their European invalids. "The portion of the Himalayas visible from Simla is a depressed continuation of the chain, extending from the emergence of the Sutlej, through the snow, to an abrupt limit bordering close upon the plain of the Punjab, near the debouchure of the Ravee. Few, if any, of the detached peaks visible rise above 20,000 feet, though the crest of Jumnotree may be seen from the highest point in Simla, which is a conical hill, named Jacko, 8,120 feet above the level of the sea."\*

It may be seen from the stations already formed, that the executive authorities have not overlooked the importance of these elevated regions as the means of securing the health of the European stranger; and if others of the hill ranges, which cross our territories, be examined, many tracts would be discovered where the British troops might be located, above the heats and diseases of the plains, although there are also many places on the plains where our European soldiers might be advantageously located; and even with the convalescent stations already established at Maroon Town, at Jamaica; at Niuera Elia, in Ceylon; on the Neilgherry and Mahabaleshwar hills, in Southern India; and at Darjeling, Missourie, Landour, and Simla, on the southern slope of the Himalayas, the authorities have commenced only where they should have ended; for if such localities be valuable for restoring the injured health of Europeans, they must be still more so as the means of preserving it; and we hope the day is not far distant, when they may be made use of for such a purpose.

When selecting a district for the location of a force, it must not be forgotten that the climate or locality suitable for one race may be very unfavourable to the health of another.

The mountain regions, or even the table-lands of India, for example, though promising great advantages to the British troops, may prove highly prejudicial to the constitutions of the men who form our native regiments; for the natives of warm countries appear to suffer as much in a cold climate, as the races from the temperate parts of the earth do when dwelling in the plains of the tropics. Indeed, we are warned of the danger of removing those who have been born in the tropics to the frigid climates of our earth, by the mortality that has occurred among them by our doing so, as in the instance of the negro troops in garrison at Gibraltar, who lost 63 per 1,000 of their strength in 1817 and 1818, while the average ratio of deaths among this class of troops in the West Indies has only amounted to 40 per 1,000 annually. A similar increase in the rates of mortality took place also at Niuera Elia, in Ceylon, which "though healthy for Europeans, has been by no means so favourable to the health of the *black troops*, particularly the negroes, who suffered in a remarkable degree. Amongst 51 stationed in the vicinity, 15 deaths took place in 1835, whereof five were from affections of the lungs."\* Where the force consists solely of Europeans, undivided attention can be given to the selection of stations most favourable to their health; but in India, where Europeans and native soldiers are usually brigaded in masses together, places must be sought for that will, in some degree, suit the constitutions of both descriptions of troops.

If an impression has been taken from the previous remarks that the

\* Montgomery Martin, Hist. of British Colonies.

† Reports, 1841.

table-lands and mountain ranges are the only places within the tropics where healthy situations for British soldiers are to be found, no such impression is intended to be conveyed; indeed, the low rate of mortality occurring among the troops at Galle (23 per 1,000), and at Poonah, (23 per 1,000), and in several other parts, sufficiently establishes the fact, that there are many localities in the low countries of the tropics highly favourable to their health, though we are more likely to meet with stations suitable for the European constitution, at a considerable elevation above the sea; and now that it is known that marked differences as to salubrity exist even in neighbouring stations, and that a great saving of men and money may be effected by judiciously locating an army, the importance of instituting a search for such healthy positions will be acknowledged. It is only by correct statistical returns and reports that this invaluable information can be obtained.

---

*Remarks on Tables of Marriages in the Irish Census Returns for 1841.*

[Read before the Statistical Society of London, 16th June, 1845.]

SIR,

Dublin, January, 1845.

IN the last number of the Statistical Journal, I observed some very judicious remarks by Mr. Hallam, on the Irish census, relating chiefly to the average age at marriage.

May I beg to offer a few remarks on that subject generally, and some explanation of the tables referred to by Mr. Hallam. I wish to do so, because I think in the inferences drawn from the marriage question, somewhat too exclusive attention is usually paid to the "average age," and too little notice taken of those who remain unmarried, as well in the different stages of life, as of those who do not marry at all.

It was from a desire to exhibit this information in regard to Ireland, that the table at p. xlii of the Report, was drawn up, which is quite different in its object from that at p. lxxvi, though drawn from the same original material. The Table at p. xlii. is condensed from the unmarried columns of the Tables which give the civil state of the community, and exhibits, therefore, only the *unmarried portion*, but being divided into ages, it shows the gradual diminution in the proportion which unmarried persons bear to the people of their own age in each decade. This in some degree indicates the force with which the marrying principle (so to speak), has pressed on the people enumerated in Ireland, in 1841. It would be very satisfactory to compare this Table with similar Tables for other countries, or other periods; but, though there are many which give the *état civil* of the whole community, I am not in possession of any which divide it into ages. It would have been very desirable to have given this Table in single years, but the uncertainty of the ages at the decennial periods alluded to at p. xlv of the Report, has here also operated, so that this Table, like many others in the volume, must be taken rather as an indication than a realization, of the views which guided the Irish census.

The other Table alluded to by Mr. Hallam, viz., that at p. lxxvi, is the reverse of this. It deals only with the *married portion* of the community, and of them, only with those who have married within the last eleven years. In this Table also the periods are much longer than could